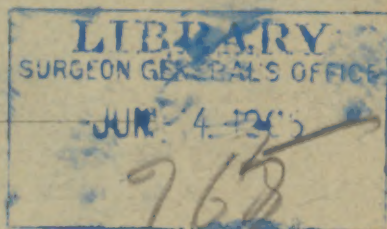


HERB (I.C.)

*Observations on one  
thousand consecutive*  
REGARDING  
*Cases of*  
Anæsthesia

Interesting Reports on the Administration of Anæsthetics and Other Information by Prominent Anæsthetists and Surgeons.

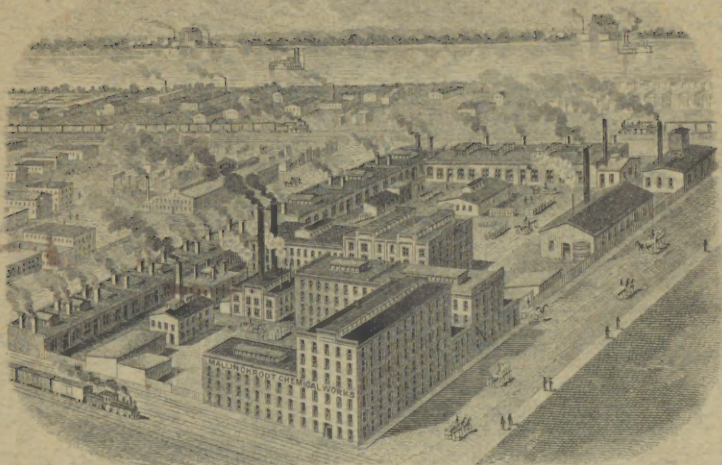


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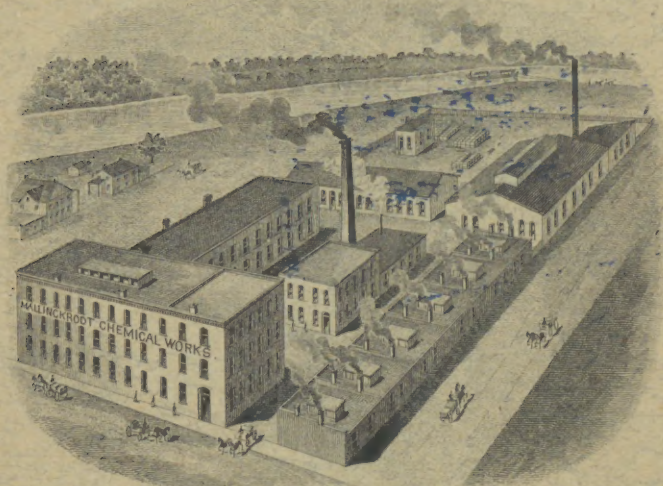
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**OBSERVATIONS ON ONE THOUSAND CONSECUTIVE  
CASES OF ANESTHESIA IN THE SERVICE OF  
DR. A. J. OCHSNER, AUGUSTANA  
HOSPITAL.**

By DR. I. C. HERB.

*Tri-State Medical Journal and Practitioner, February, 1899, issue.*

The cases presented were operated on by Dr. A. J. Ochsner at the Augustana Hospital during the last fourteen months, beginning September 3, 1897, ending November 9, 1898, being the third thousand in a continuous series of observations; the first thousand having been reported by Dr. Lawrence H. Prince, the second thousand by Dr. G. W. Green. As in the other reported cases this series includes only those in which a general anesthetic was necessary.

Of these one thousand consecutive cases 397 were males, 603 females; fourteen were under one year of age, seven were over seventy years of age. The youngest was thirty-six hours old, the oldest seventy-seven years.

Chloroform was used alone 110 times, ether three times, chloroform and ether in all of the other cases. The longest duration of chloroform fifty-two minutes, ether seventy-seven minutes, chloroform and ether two and one-half hours. Shortest duration chloroform anesthesia five minutes, chloroform and ether ten minutes.

Average amount of anesthetic used was 8 cc. of chloroform, 115 cc. of ether. The average time to produce surgical narcosis, not unconsciousness, was eight minutes. The shortest time for induction was one minute. This little patient, operated on for spina bifida, was put to sleep and kept asleep for twelve minutes on 1 cc. or about 15 minims of chloroform.

Contrary to the opinion of some observers, Dr. Prince made the statement in one of his articles on anesthesia, that in his belief shock could be produced during profound surgical anesthesia by the manipulation of sensitive parts. In support of this opinion I will report in detail the following cases:

Case 2831.—Was a very fleshy man, forty-three years of age, an alcoholic who had a strangulated inguinal hernia. The patient was suf-

fering most excruciating pains from the severity of the strangulation, which occurred in the hospital during an attempt at gastric lavage. Chloroform and ether were administered in the usual way within a few minutes after the strangulation occurred. It was found very difficult to reduce the strangulation by taxis, and with the beginning of the manipulations the patient showed a tremendous amount of shock. The pulse became more and more rapid, going up to 160 beats per minute, and then became so weak that it could no longer be counted. Respiration was shallow and the body was covered with perspiration. The anesthetics and the manipulations were stopped and the conditions were improved slightly. The reduction was then completed without giving any more of the anesthetic. The condition of the pulse remained dangerously weak for about two hours after the anesthetic was administered. A week later the same anesthetics were given in the same manner for an operation for a radical cure of the hernia, and the patient's condition remained normal throughout the operation, his pulse and respiration being observed very closely. This seems to show that his previous condition was due to the shock caused by manipulation, rather than to the anesthetics.

The operations performed included 104 appendectomies, 159 laparotomies, 57 herniotomies, 14 vaginal hysterectomies, 9 kidney operations, 12 amputations, 15 fractures, 4 old dislocations, 108 bone operations, 165 minor gynecological operations, 355 operations on soft parts not classified.

In presenting this subject of a thousand cases without a death, I have a double object. First, to advocate this special method of inducing anesthesia, and second to make a plea for the anesthetic specialist. We believe that in every well regulated hospital, or institution, where surgery is done to any extent, there should be an anesthetizer on the staff. This does not necessarily mean that this person should give every anesthetic, but it does mean that he should have general supervision, instructing the internes or assistants, making careful observations on the different conditions presented and keeping accurate records.

The method which I will briefly describe is the one invariably used in the Augustana Hospital, and was introduced in that institution by Dr. Lawrence H. Prince in 1896. The day before the operation the patient is subjected to a thorough examination, when the condition of

the heart, lungs and kidneys is noted. A warm bath is given to stimulate elimination. In order to have the alimentary tract in the best possible condition the diet is limited to liquids, and one or two ounces of castor oil is given, to be followed the next morning by a warm enema. On the morning of the operation when the patient is taken to the anesthetic room, the anesthetic number, date, name, sex, age, general condition, habits and time are noted. For this purpose we use the blank which I will pass around. The remainder of the blank is filled in after the operation is completed. The face is anointed with vaseline, a thick pad of moistened cotton placed over the eyes, and anesthesia commenced, the patient being instructed to count after the anesthetizer. The inhaler used is the Esmarch mask covered with three or four layers of gauze, the number depending on the quality of gauze. The same mask is used for chloroform and ether, as well as the same method of administration, namely, the drop method. Chloroform is given till the patient is asleep or insensible when ether is substituted. If, however, at any time during the administration of the chloroform the breathing becomes shallow or the heart embarrassed the chloroform is stopped altogether, suspended for a time or a few drops of ether given with the chloroform. The two anesthetics are never mixed together but kept in separate bottles. In this way the exact amount of each can be regulated according to the discretion of the anesthetizer, which is a great advantage to one who understands the points of advantage and disadvantage of each of these agents.

We think the simple Esmarch mask superior to any other for ether as well as chloroform, because it allows an abundant admixture of air which is desirable not only during anesthesia but to avoid after complications. Patients do not become so thoroughly saturated with the poison, consequently the danger to lungs and kidneys is decreased, besides there is less retching and vomiting afterwards, advantages not to be ignored by conscientious workers. No drugs are ever used either before or during the anesthesia. As soon as sleep is induced the lower jaw is hooked over the upper and held in this position. We deprecate the use of gags because they throw the jaw backwards, the very thing to be avoided. The head should be on a level with the body, a small, hard pillow being preferable to a feather pillow. The patient is not removed to the operating table till thoroughly asleep,

and this is done as gently as possible. If removed too soon he is sure to retch or vomit and will consume as much time in going to sleep as at first.

The pupillary reflexes are an infallible guide to the degree of narcosis. No attention is ever paid to other reflexes. We believe touching the cornea is as unscientific as it is unclean. It tells you absolutely nothing further than that your patient is unable to resent the insult. A contracted, immovable pupil teaches us we have surgical narcosis. A dilated, immovable pupil has danger written everywhere, while a dilated pupil which reacts to light shows only partial anesthesia. A very trying position for an anesthetizer, and one which tests his judgment as well as the patience of the operator, is where the patient is asleep but holds the abdominal muscles tense during manipulations or breaking up of sensitive adhesions. If these patients are allowed a few whiffs of fresh air and the anesthetic resumed the spasm will pass away. On the other hand if the narcosis is not complete a few drops of chloroform will relax the muscles.

A word about artificial respiration, which we found necessary to perform in six cases. The tongue should be drawn out, the jaw held forward, the arms grasped near the elbows and swept around away from the body and over the head till they meet above it, then given a strong pull for a few seconds, then return to their former position alongside the chest making pressure against the lower ribs. This plan if regularly carried out, should make about sixteen complete acts of respiration in a minute. As is well known, this is the regular Sylvester method of performing respiration, and you are all familiar with it, yet there is not one person in twenty who performs it properly. The arms are moved too rapidly and too great force is used on the chest. Stretching the sphincter seemed to be of some value. In no case was any drug used. The patient needs pure air and when supplied with it quickly revives.

In the first five hundred cases Squibb's chloroform and ether were used, in the last five hundred **Mallinckrodt's** brand was used. There was no difference observed in favor of either manufacturer's products.

It was observed that alcoholics and morphinists resisted the anesthetic for some time, but when they finally succumbed it was with surprising suddenness and narcosis was very profound. When anesthesia is established they require no more to keep them asleep than other patients.

Many times in young children we noticed a peculiar moan on inspiration, which means spasm of the glottis. This may occur before or after narcosis is complete, and unless fresh air is allowed the child will stop breathing.

These observations seem to confirm the following conclusions:

1. If anesthetics are given carefully, according to the method described, difficulties of any kind are experienced in only a very small proportion of cases.
2. That a dilated, immovable pupil is a sign of danger before heart or respiration show any change.
3. That the Esmarch chloroform mask is superior to any other for ether as well as chloroform.
4. That the method described requires less anesthetic and a shorter time for induction of narcosis.
5. That patients quickly revive when given fresh air, without the use of drugs.
6. That anesthesia should be more thoroughly taught in our medical colleges and hospitals.

In order to economize space the following classification has been condensed as much as possible, the various operations being grouped together according to the regions of the body.

Among the minor gynecological operations each patient had two or more operations, but only the most important is enumerated below.

Abdominal sections for appendectomy.....	104
"        "        "    excision ovarion cysts.....	24
"        "        "    ovariotomy .....	6
"        "        "    excision pyosalpinx .....	39
"        "        "        "    extra uterine pregnancy....	8
"        "        "    Caesarian section .....	1
"        "        "    myomectomy .....	5
"        "        "    hysterectomy (fibroid) .....	16
"        "        "    cholecystotomy .....	8
"        "        "    inguinal colostotomy .....	3
"        "        "    exploration .....	12
"        "        "    for other conditions.....	37
Herniotomy for ventral hernia.....	3
"        "    inguinal hernia .....	39
"        "    umbilical hernia .....	3
"        "    femoral hernia .....	12
Nephrorrhaphy .....	6
Nephrectomy .....	2
Nephrotomy .....	1
Hysterectomy vaginal (for carcinoma).....	14
Amputations .....	12

Reducing old dislocations.....	4
Operations for fractures.....	15
"    "    relief flat foot.....	2
Operations for club foot.....	8
"    "    anchylosed hip .....	3
"        "        shoulder .....	1
Suturing fractured patella.....	2
Amputation breast .....	18
Suprabupic cystotomy .....	7
Urethrotomy .....	10
Operations for relief enlarged prostate.....	15
"    "    hydrocele .....	12
"        "        varicocele .....	10
Plastic for hypospadias.....	1
Circumcision .....	17
Removal tumors from soft parts.....	32
Trephining skull .....	9
"    mastoid abscess .....	5
Operations for cleft palate.....	12
"    "    alveolar abscess .....	6
"        "        epithelioma face .....	12
Tonsillotomy and removal of adenoids.....	9
Operations for hare-lip.....	5
"    "    nevus of face.....	7
"        "        actinomycosis face .....	2
Plastic on face .....	10
Enucleation of eye.....	2
Excision tubercular glands.....	46
Strumectomy .....	3
Tracheotomy for carcinoma larynx.....	1
Excision ganglion wrist.....	3
Plastic for contracture of hand.....	3
Lengthening of tendons for contractures.....	7
Excisions of tubercular joints.....	18
Stretching sciatic nerve.....	1
Gun shot wound.....	2
Removal foreign body from leg.....	1
Morton's operations for metatarsal.....	6
Operations for osteomyelitis.....	21
Removal of floating cartilage.....	3
Operations for an anal fistula.....	31
Removal hemorrhoids .....	44
Minor gynecological operations.....	165
Excision coccyx .....	2
Resection ribs for empyema.....	6
Reduction hernia ( taxis).....	1
Excision varicose veins of legs.....	18
Skin grafting .....	17
Excision spina bifida.....	2
Incision cellulitis .....	6
Operations on antrum.....	4
Total.....	1,000

This blank is used, and carefully filled out with each case:

No. \_\_\_\_\_ Date: \_\_\_\_\_  
Name: \_\_\_\_\_ Sex: \_\_\_\_\_ Age: \_\_\_\_\_  
General condition and habits: \_\_\_\_\_  
Urinalysis before: \_\_\_\_\_  
" after: \_\_\_\_\_  
Preparations for anesthesia: \_\_\_\_\_  
Operation: \_\_\_\_\_  
Anes. begun: \_\_\_\_\_ Anes. ended: \_\_\_\_\_ Time: \_\_\_\_\_  
Operation begun: \_\_\_\_\_ Operation ended: \_\_\_\_\_ Time: \_\_\_\_\_  
Time for complete anes: \_\_\_\_\_ Anes and amt: \_\_\_\_\_  
Method: \_\_\_\_\_  
Complications: \_\_\_\_\_  
Observations: \_\_\_\_\_  
Post anes. condition: \_\_\_\_\_  
Operator: \_\_\_\_\_ Anesthetizer: \_\_\_\_\_  
51 Lincoln Avenue,  
CHICAGO.

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## HOW TO GIVE ANAESTHETICS.

By WILLIAM S. DEUTSCH, M. D.,  
ST. LOUIS,

*Anæsthetist to the Missouri Medical College Surgical Clinic, Dr. Tuholske's  
Surgical and Gynæcological Hospital, etc.*

Read before the Missouri Medical College Alumni Association, April 15, 1899.  
(From New York Medical Journal.)

From the title of this paper it might be judged that I mean to pose as an instructor in the art of anaesthetization, or perhaps place myself on a higher level than the many physicians who are daily called upon to administer anaesthetics. This is not my object, but I mean only to present to you such facts and experiences as appeal to me as I now look back over my past eight years' work in this field.

I believe that those practitioners who administer anaesthetics will agree with me that they have derived little or no benefit from reference or text books on this subject, but have been compelled, like myself, to study and learn the art of anaesthetization in the hard school of experience.

Ether and chloroform are the only drugs I have been called upon to administer. I have given ether seven hundred and eighty times and chloroform two hundred and ninety-five times; now making a total of a thousand and seventy-five anaesthesias, and, I am glad to be able to report without one death. These anaesthetics were not used

in selected cases, but were administered in the charity wards of city institutions, college dispensaries, private hospitals, and private practice.\*

I believe that the art of administering anaesthetics can be learned only by continual practice. Books and the experiences of others count for little, for the prime prerequisites for the making of a successful anaesthetist are self-confidence, the knowledge of the dangers that might arise during the administration, and ability to combat them when they occur.

What surgeon or physician does not appreciate what a sense of responsibility and what a bugbear the anaesthesia is to him, and how different does he feel when a stranger is giving the anaesthetic! How often is the operation so small that it really is of secondary importance as compared with the dangers of anaesthesia! I believe, therefore, that the time should be close at hand when in this country more physicians will make a study of and follow as a specialty the administration of anaesthetics; and, furthermore, that this subject will be taught separately and thoroughly in our medical schools.

There are some underlying rules and principles which should govern every administrator of anaesthetics, and they are the following:

He must give the anaesthetic, and absolutely and positively do nothing else. By this I mean he must not allow his whole attention or any part of it to be taken away for a minute from the patient under the anaesthetic. Neither the interesting operation, the talkative physicians around, nor a fascinating nurse should for one second engage his attention, for in that time his patient might die—I care not how well skilled he may believe himself to be, or how certain he feels that he has a healthy patient under the anaesthetic, for it has been under exactly such circumstances that a death from anaesthesia has occurred.

I have not any doubt but that death will occasionally occur from an anaesthetic, even when administered by men who have had experience in the art, from causes over which they have no control, and it therefore behooves us to do everything in our power to place ourselves in a position, should death occur, that we may be able to conscientiously say that we have taken every precaution, were thoroughly prepared, and have given our undivided attention to our patient.

\* The writer states: "I am using Mallinckrodt's *Pure Chloroform* and *Ether for anaesthesia* with perfect satisfaction, and always insist upon receiving fresh-sealed packages.

Time will not permit me in this paper to discuss or even refer to the many methods of administering an anaesthetic, but I shall give you only what I have found to be a successful method, and a few hints that may be of benefit to you.

If possible, know your patient long enough to determine for yourself how you must handle him or her. Therein lies the great secret of proper anaesthetization.

Bearing in mind that the phenomena of anesthesia are largely dependent upon temperament, age, physique, quantity and quality of blood, state of the respiration, circulation, and other factors, we can not fail to recognize the advantages of ascertaining as far as possible the condition of the patient intrusted to our care. In the majority of cases a brief inspection is all that is necessary. The more practice the anaesthetist has had the less need will there be for a systematic examination; but even so, it is better to err on the side of an unnecessarily cautious investigation than to overlook symptoms or signs which, if recognized, would be of service in conducting the administration. It is certainly erroneous to argue that, as the patient must have an anaesthetic, there is no need to ascertain his fitness for it. By carefully taking into consideration the condition of the patient we not only place ourselves in a better position to decide which anaesthetic to choose, but we are enabled to anticipate the occurrence of important symptoms that might arise during the administration.

A great deal of valuable information, both positive and negative, is afforded by the general appearance and bearing of the patient. Let us in a few words consider what can be learned by simply observing the individual before us.

Should he walk to the operating table, his mode of progression may afford us information. We should notice whether he moves actively or whether with considerable hesitation or difficulty. Should the exertion be followed by breathlessness, we ought specially to bear the fact in mind. Should the patient be partially or wholly recumbent when we are called upon to anaesthetize him, we should notice what position is assumed by choice. We should more particularly pay attention to the number of pillows the patient requires. Those who suffer from chronic bronchitis, emphysema, other affections of the air-passages, or extreme abdominal distention, almost

invariably insist on being propped up to a greater or lesser degree. Marked orthopnoea will attract attention, and should be regarded as a very unfavorable symptom. Patients suffering from unilateral pulmonary or pleural affections will probably be found lying on the diseased side. While observing and drawing our inferences from the walk or posture of the patient, we are able, as a rule, to roughly estimate his age. It must be remembered that the anaesthetist is concerned as much with the apparent as the real age of his patient.

Temperament, too, which plays an important part in determining the manner in which an anaesthetic is taken, usually quickly shows itself on these occasions. This is more particularly the case with hysteria. It must be remembered, however, that women who are liable to outbursts of hysteria sometimes conceal their want of control so efficiently that the observer is deceived. The overworked and highly strung patient will be recognized, and should be treated with the utmost gentleness and care. Previous excesses in alcohol, as a rule, present little or no difficulty in their detection. The general physique of the patient will be observed. Gross, flabby individuals, with a large abdomen, muddy complexion, and double chin, will probably not be easy subjects to manage. Florid, muscular young men, who live an outdoor life and enjoy excellent health are also likely to give the administrator some difficulty. Persons afflicted with extreme obesity may also be regarded as bad subjects for certain anaesthetics, especially ether. Conversely, patients of slim build and more or less anaemic in appearance do particularly well during general anaesthesia.

The color of the patient's face and lips should be noticed. A florid, rosy tint denotes, as a rule, a good state of health and the absence of nervousness or respiratory derangements. The hectic flush, however, must not be allowed to deceive. Florid, and more especially dusky-looking and congested-looking patients will be very likely to show cyanosis if air is withheld even to a slight degree. The pallor of true anaemia is readily recognized. Apart, however, from this pallor we must remember that very nervous and apprehensive subjects are prone to be much paler than usual at the time of administration. Their pallor disappears when anaesthesia is established, and, often to the surprise of the anaesthetist, to whom the patient may be a stranger, a good, florid color will persist throughout the administration.

The anaesthetist should take special note of the manner in which respiration is performed, and if any marked abnormality in this direction is detected, a further examination of the patient should be made. If there is no obvious shortness of breath or distress in breathing, and if the respiratory movements are quiet and the color of the lips good, there is, as a rule, no need for any further examination. It is usually a good plan, however, to ask the patient to take a deep breath. In this way the administrator will see whether the chest expands freely and whether the respiration is principally thoracic or abdominal. A loose, frequent, or hollow cough should not escape attention.

The pulse should invariably be felt, and, as a general rule, it is a good plan to apply the ear or stethoscope to the chest. Feebleness, irregularity, intermittency, or marked slowness of pulse should lead to further inquiry. The oral cavity should be inspected. Artificial teeth, even though firmly fixed and apparently safe, should always be removed, so as to avoid the chance of their becoming lodged in the trachea and strangling the patient. If a partial or complete nasal obstruction is present, in order not to give trouble a mouth prop should be inserted so as to give an oral air way.

Before administering the anaesthetic certain appliances and drugs should be at hand, and by that I mean, so near that the anaesthetist can put his hand on whatever he wants the instant he needs it. An instrument for opening the mouth and, if necessary, maintaining it in this position. A forceps, preferably one with a flat blade, so as to be able to grasp the tongue firmly, but at the same time not lacerate it. Besides this forceps a thin, long forceps should be at hand with which to grasp small sponges for wiping out the mouth and pharynx. Of drugs, nitrate of amyl, best in the shape of five-minim pearls, which can be readily crushed and used by inhalation. Strychnine sulphate, one-sixtieth or one-fortieth of a grain, should be kept ready in a hypodermic syringe. Nitroglycerin, digitalis, aromatic spirits of ammonia, and whiskey. The Bliss-Moore Co., of St. Louis, have got up for me a portable case containing these articles.

Just a few words regarding the patient's clothing during anaesthesia: It must always be loose, no constrictions of any kind to be allowed to remain on the body. The patient should either be clad in a warm dressing gown or wrapped in a blanket, especially if feeble or in advanced years.

Before beginning the remarks of the mode of administering the anaesthetic, I want to call particular attention to the all-important rule that the stomach and bowels of the patient should be empty. I have made it a rule never to give an anaesthetic when I ascertain that the patient has taken food three hours or less before the time of operation, unless the case is of an emergency character, when the exception becomes necessary. This precaution avoids the possibility of the patient strangling from vomited material in the trachea while in no condition to dislodge it, and at the same time prevents the vomiting from disturbing the surgeon. Now, as to the choice of the anaesthetic and the mode of its administration.

Conditions being equal, my preference is for ether. Perhaps I lean toward ether because I have given it oftener than chloroform, and, therefore, feel more at home with it. I am not of the opinion that so often is expressed that one can give an overdose of ether and the result not be as serious as if it were chloroform. I believe a good rule to follow is to give the anaesthetic to the patient, and not the patient to the anaesthetic; in other words, give just as much anaesthetic as is necessary and not one drop more. It has been my great privilege to administer anaesthetics more than six hundred times for Professor H. Tuholske, and I know that the same careful and conscientious way which he carries out in every step and detail of his operations has been forced upon me in the giving of anaesthetics. In his service I have certainly learned that, all things being equal, the less of the anaesthetic drug that is given the better will the patients do; also that patients have a greater tolerance for pain under these circumstances than is often credited to them. Several times when the extreme weakness of our patient prohibited the continuance of the anaesthetic, have I seen him perform coeliotomy, handle the abdominal viscera, yes, even make intestinal anastomoses with the patient wide awake. So, also, have I seen him perform craniectomy entirely without an anaesthetic; also resection of the superior maxilla.

I have tried the open and closed methods of etherization, and I believe the open way to be the better. I think the Allis inhaler, which allows a certain amount of admixture of pure air, brings about a safer anaesthesia, and certainly a pleasanter one for the patient. I have found pupillary reflexes an infallible guide to the degree of narcosis. No attention is ever paid to other reflexes. I regard

touching the cornea as unscientific as it is unclean. It tells you nothing more than that your patient is unable to resent the insult. A contracted, immovable pupil teaches us that we have surgical narcosis; a dilated, immovable pupil predicts danger everywhere; while, again, a dilated pupil which reacts to light shows partial anaesthesia. I have found that pure air often revives patients without the use of drugs.

In conclusion, I wish to suggest a safe rule to guide the anaesthetizer in his work—viz., do not start the administration before everything is ready for the operation. Keep your patients just under enough to allow the surgeon to do thorough work, and aim to have them return to consciousness as soon as they reach their bed-rooms.

1721 Washington Avenue.

## THE RELATIVE MORTALITY OF ETHER AND CHLOROFORM ANAESTHESIA.

Extract from *Medical News*, Oct. 29th, 1892.

In preparing statistics upon the subject of ether and chloroform as anesthetics, we have endeavored to adhere closely to certain principles of criticism, which we reluctantly adopted as absolutely necessary in order to reduce the evidence before us to coherence. Data of varying degrees of merit, and obtained under such different conditions that it is the greatest carelessness to range them together as facts of equal weight, are nevertheless commonly found side by side. From such statistics we could not draw any definite conclusions. Nay, the conditions are ignored which we proposed to ourselves as the ultimate test of the value of any series of data. Are there, we asked ourselves, any observations recorded that show that ether and chloroform have been fairly tried together upon that common ground on which both may enter as anesthetics and display their peculiar powers upon cases regularly selected with care and judgment? Pursuing this object, we have been on our guard against any bias in ourselves, and have carefully searched for it in the writings of others.

The number of papers to be examined is astonishingly great. Most of them, we are sorry to say, are liable to the suspicion of partiality. Among those of doubtful authority, from our own point of view, which, it must be remembered, is purely critical, are the following: The experimental; those recounting individual experiences with ether

alone, or with chloroform alone; those that assume that the use of chloroform ought to be entirely abandoned; the controversial and polemic, of which unfortunately there are some. Secondly, we have noted as instances of that frame of mind which is unsuitable for fair judgment, such statements as Surgeon-Major Lawrie's, that "the most important result of the labors of the Hyderabad Commission has undoubtedly been to establish the proof that chloroform has never, under any circumstances whatever, a direct action upon the human heart"; or M. Julliard's confession that for ether he has long been "*un partisan convaincu*"; or again, his saying, too loosely we feel, that "Prof. Tripier has administered ether without accident 6500 times, while on the other hand he had a case of death *sur un nombre infiniment moindre de chloroformisation.*"

It is enough to observe here that by following any party or school we cannot arrive at the truth. In our own judgment, it is assuredly unfortunate that men will use one anesthetic exclusively, as these gentlemen do, for some cases are fit for chloroform, others for ether, others again for nitrous oxide gas, still others, perhaps, for the A. C. E. mixture.

Naturally, we have not found many statistics that are free from the faults that we have either pointed out or hinted at. Indeed, we know but one that is accurate, and has besides the merits we required. Such statistics, we felt bound, must show observations of scientific accuracy, taken during a considerable time, under uniform conditions, by men of approved ability and knowledge entirely interested in a fair trial of ether and chloroform, using neither one nor the other exclusively, but both alike and as nearly as possible an equal number of times; with registrations made at the time of the operation, of the number of cases, with the deaths and accompanying circumstances. By means of these statistics and these alone, may we hope to arrive at a final judgment on the controverted claims of ether and chloroform. We append a table of these desirable data. It is compiled immediately from the *St. Bartholomew's Hospital Reports*. It includes all the observations made:

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*"Mallinckrodt's" or "M. C. W." Ether for anaesthesia and "M. C. W." Chloroform for anaesthesia should be specified to avoid confounding with other grades not intended for anaesthetical purposes.*

Number of Cases.				Deaths.			Remarks on the cases pertaining to chloroform.
Year.	Chloroform.	Ether.	Ether preceded by nitrous oxide.	Chloroform.	Ether.	Ether preceded by nitrous oxide.	
1875	617	120	764	None	None	None	
1876	670	28	1004	"	"	"	
1877	699	23	1123	"	"	"	
1878	794	15	1009	1	1	"	Syncope after operation.
1879	975	26	984	1	None	"	Syncope after operation.
1880	1055	43	1304	None		"	
1881	1072	85	1209	1	None	"	Syncope before operation.
1882	1340	337	1076	2	"	1	
1883	1421	566	1156	2	"	None	
1884	1244	1016	704	None	"	"	
1885	1331	1118	386	"	"	"	
1886	1425	1169	567	1	"	"	Syncope before operation.
1887	1702	1197	602	1	"	"	Syncope after operation.
1888	1711	1003	349	1	"	"	
1889	1601	810	509	2	"	"	Syncope.
1890	1860	968	135	1	1	"	Syncope.
Total,	19,526	849	12,941	13	3	1	
Proportion of deaths.	1 : 1502	1 : 2800	1 : 12,941				

It must be admitted that these results are by no means favorable to chloroform, yet we do not go so far as to say, with M. Julliard, that we must show these statistics to be inexact, or renounce chloroform. We see that the use of chloroform has increased with moderate fluctuations, reaching a maximum in 1890, and a preponderance over ether in that year of 127 cases with one death for each anesthetic. It is evident, then, that the surgeons had sufficient confidence in chloroform to continue its use—a fact in its favor. Whether this confidence is deserved we may judge by an examination of the circumstances attending the death. In the right-hand column of the table

we have noted the cases of syncope; these may be left to speak for themselves. Of the remaining deaths, we may ascribe two to asphyxia. The others, we think, were highly probable with any anesthetic. Thus we have nine deaths out of thirteen which sufficiently enforce the peculiar dangers of chloroform. With these facts before us we cannot feel any great degree of confidence in that anesthetic. If, on the other hand, we look at the circumstances attending the three deaths under ether, we shall see that they were almost inevitable. The report of the first is as follows:

(1) A man aged forty-seven, died when under the influence of ether. He was suffering from intestinal obstruction for which lumbar colotomy was undertaken. In the morning he had had a severe attack of dyspnea. He was in a state of profound collapse at the time of the operation; his belly was tumid, his respiration shallow, and his pulse feeble. He vomited frequently, and after inhaling ether for ten minutes became livid and never again rallied.

(2) A man, aged sixty-one, suffering from strangulated inguinal hernia, died under the influence of ether. He had been delirious the previous night; his pulse was irregular and feeble, and he had constant vomiting. During the operation the pulse became imperceptible, and finally respiration ceased. At the necropsy the heart-substance was found slightly fatty, the cavities were nearly empty, containing no clots. The lungs were emphysematous; all the posterior parts were engorged with blood.

(3) A man, aged fifty-six, died under the influence of ether. He was a drunkard and had sustained a fracture of the tibia and fibula. After suffering from delirium tremens for ten days, ether was administered in order to reset the broken bones. This was satisfactorily done, and three minutes after the cessation of the administration of ether the heart suddenly ceased beating, then respiration stopped, and the patient died. A post-mortem examination showed the lungs much engorged, a flabby heart, and a fatty liver.

We have given great prominence to these statistics on account of the merit they possess and the excellent model they furnish. We cannot be too grateful for them.

Next to the statistics of St. Bartholomew, we selected others from the *Proceedings of the German Chirurgical Society*, Berlin, April, 1891. They are inferior in many particulars, and they furnish very

few administrations of ether. The data were supplied by 66 colleagues, chiefly German, besides 3 Austrian, 3 Russian, 2 Swedish, 1 each from Holland and Belgium. Bardeleben, from the Charité, 1878-90, sends statistics of over 12,000 administrations of chloroform with 7 deaths. In addition were reported:

	Cases.	Deaths.	Asphyxias.
Chloroform alone .....	22,656	6	71
Ether alone .....	470	0	0
Ether and chloroform.....	1,055	0	5
		<hr/> 6	<hr/> 76

There was thus one death in 3776 administrations of chloroform. The duration of the narcosis in 2732 cases was one hour; in 278 a longer time, sometimes from 150 to 155 minutes. In the Charité, in the last six years, 1 c. cm. of chloroform was used per minute during the narcosis. The greatest amounts used during an operation ranged from 150 c. cm. to 180 grams.

Next we give the results of individual experience, furnished by 42 authors. They were published in February, 1891, by M. Julliard (*Rev. Médicale de la Suisse Romande*, 1891, vol. ii), who based them on Compté's table. We have added some others published since.

#### CHLOROFORM.

	Administrations.	Deaths.	Proportion.
1. Andrews .....	117,078	43	1 : 2,721
2. Coles .....	152,260	53	1 : 2,873
3. Richardson .....	35,165	11	1 : 3,196
4. Ker .....	36,500	1	1 : 36,500
5. Rendle .....	8,000	3	1 : 2,666
6. Army Circular .....	80,000	7	1 : 11,448
7. Baudens .....	10,000	1	1 : 10,000
8. Nussbaum .....	15,000	0	
9. Billroth .....	6,000	2	1 : 3,000
10. Billroth .....	12,500	0	
11. König .....	7,000	0	
12. Kappeler .....	5,000	1	1 : 5,000
13. Mills .....	4,810	2	1 : 2,405
14. Lyman .....	5,860	1	1 : 5,860
15. Julliard .....	1,000	1	1 : 1,000
16. Académie de Med.....	5,200	1	1 : 5,200
17. Anstie .....	3,058	21	1 : 145
18. German Statistics.....	7,000	1	1 : 7,000
19. Maud Hospital.....	500	1	1 : 500
20. 13 Eng. Hosps. (Asclepiad).....	35,162	13	1 : 2,704
21. Glasgow West. Infirm.....	10,000	4	1 : 2,500
22. " Children's Hosp.....	2,160	0	
23. Atthill .....	5,000	1	1 : 5,000
24. Kashmir Mission Hospt.....	5,000	0	

	Administrations.	Deaths.	Proportion.
25. Buchanan .....	10,000	1	1 : 10,000
26. Wallace .....	14,000	0	
27. Lawrie and Syme.....	45,000	0	
28. R. Williams (Middlesex).....	208	1	1 : 208
Total.....	638,461	170	1 : 3,749

#### ETHER.

	Administrations.	Deaths.	Proportion.
1. Andrews .....	83,815	4	1 : 20,953
2. Coles .....	92,815	4	1 : 23,204
3. Gerster .....	10,791	6	1 : 7,798
4. Lyman .....	16,542	1	1 : 16,542
5. Warren .....	20,000	0	
6. McGunn .....	13,000	0	
7. Bigelow .....	15,000	0	
8. R. Williams (Middlesex).....	1,050	1	1 : 1,050
9. Mills .....	6,440	2	1 : 3,220
10. Julliard .....	3,654	0	
11. Bruns .....	300	0	
12. Tripler .....	6,500	0	
13. Dumont .....	750	0	
14. Ollier .....	29,500	0	
Total.....	300,157	18	1 : 16,675

If we add Dr. Rabatz's experience with ether, 150,000 administrations without a death, we have the weightiest evidence yet adduced by a single expert of the superior safety of anesthesia with ether.

We have not space for a critical estimate of the value of these tables. We dare not draw any bold conclusions from them. A glance will show that in some hands ether has not proved any safer than chloroform, but this statement is not entitled to much weight, because we do not know what causes may have brought about this result, nor how under the same conditions chloroform would have behaved. In conclusion, we confess that before our survey we were disposed to prefer chloroform, but we have seen enough to convince ourselves that there is wisely going on a considerable retrenchment in its use, and that there is destined to be a still greater decline. How great this retrenchment ought to be is an interesting question which we should like to be able to determine. Unfortunately this is impossible. Even among men of the greatest practical skill and experience there is a difference of opinion as regards the choice of ether or chloroform in cases in which it seems to us one is clearly preferable. We refer to the operations of abdominal surgery. In such cases, Mr. Lloyd, whose paper in the *Lancet*, March 14, 1891, is dis-

tinguished by admirable clearness and good sense, prefers ether. On the other hand, Dr. Gaillard Thomas asks if chloroform would not be better, at least in celiotomies. We take leave of the matter with this example, among others that we have noticed, of the unavoidable perplexity and disagreement of all who interest themselves in the various claims of the two anesthetics—a disagreement that, while it lasts, will suffer the choice of a suitable anesthetic to remain with each practitioner, and leave the way open for abundance of error.

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## AN INTERESTING REPORT ON ANAESTHESIA.

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*Editorial by Dr. Warren C. Outten, Chief Surgeon Missouri Pacific Railway Hospital System.*

Reprinted from the February, 1899, issue of The Tri-State Medical Journal and Practitioner.

We have recently received an interesting report upon this subject from Dr. A. J. Ochsner, of Augustana Hospital, Chicago. The cases presented were operated upon by Dr. Oschner during the last fourteen months; being the third thousand in a continuous series of observations. The method of administration is careful and praiseworthy. The day before the operation the patient is subjected to a thorough examination, noting the conditions of the organs. A warm bath is given to stimulate elimination, the alimentary canal cleared, and the next morning an enema is still further employed. He believes the Esmarch mask is superior to all other means of administration. No drugs are used. The lower jaw is hooked over the upper; no gags are needed. The head at the time of anaesthetizing is placed on a level with the body; the pupillary reflexes are solely used, and believed to be an infallible guide; for a contracted, immovable pupil teaches us we have surgical narcosis. His conclusions concerning the administration and results of chloroform are certainly well timed and sensible, and confirm the following conclusions: Difficulties are rare when chloroform is so administered; a dilated, immovable pupil is the first sign of danger; the Esmarch mask is superior to all others, and that anaesthesia should be more thoroughly taught. For the past two years the editor of this journal has pursued the essential same method as used by Dr. Ochsner, excepting that we have not used anything but chloroform. We are ardent believers in the great force

of timely suggestion in the administration of chloroform. The patient has explained to him how the anaesthetic will act, and when administered suggestion of the Esmarch inhaler, attention to pupil and jaws are imperative. A constant stream of pleasant and placating suggestion is kept up by the anaesthetist until unconsciousness is reached. Thus, in illustration, the anaesthetist says to the patient: "Now, if you take this right, there will be no struggle and before you know you will be asleep." "Do you notice what a sweet taste the chloroform has?" "Now, then, breathe slowly and regularly; if this chokes you, push it (the mask) away." "Do you feel that wavy, tremulous sensation—peculiar, is it not?" "You begin to feel stimulated?" "Why, you take it splendidly, just as easily as anybody I ever saw!" "That's right! You are doing splendidly!" "Well, well, how nicely you take it. Why, it's like a dream"—and so on. When subconsciousness is reached, the anaesthetist says: "Well, Dr. So-and-So, it couldn't be better! Why he fell asleep like a baby?" We maintain that every word of the anaesthetist counts, and every suggestion counts. Suggestion in our hands has been most successful; merciful and placating, it soothes and lulls every suspicion and robs the brain of mental strain. Dr. Ochsner mentions that in the first five hundred cases Squibb's chloroform and ether were used; in the last five hundred, Mallinckrodt's. For the past year, in the St. Louis Hospital Missouri Pacific Railway, we have used nothing else but that of the Mallinckrodt Chemical Works, and we have been as successful as with Squibb's. This came from the reason that at times Squibb's could not be obtained; but, finding the Mallinckrodt's equally as reliable, we have been relieved of a dread, for we only had faith, at one time, in Squibb's; now we are satisfied that we have equally as reliable an agent in Mallinckrodt's. Both of these products are certainly competent to stand the highest test for safety and efficiency.

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